What is claimed is:

COM RAST

10

- 1. A method of estimating channel order of a bounded length channel having at most L non zero taps located within an M symbol time interval, said method comprising the steps of: calculating an initial channel estimate using a channel length of M taps;
- calculating the energy of the taps of said initial channel estimate; averaging said tap energies over time;

selecting a threshold in accordance with a noise floor calculated using the M-L taps having the lowest average energies;

setting the channel order N to the number of taps above said threshold; and wherein L, M and N are positive integers.

- 2. The method according to claim 1, wherein said step of calculating said initial channel estimate is performed using a least squares technique.
- 3. The method according to claim 1, wherein said step of calculating said initial channel estimate is performed using a correlation technique.
- 15 4. The method according to claim 1, wherein said channel taps are represented as zero mean, complex, Gaussian random processes.
 - 5. The method according to claim 1, wherein said channel taps are represented as non zero-mean, complex, Gaussian random processes.
 - 6. The method according to claim 1, wherein said channel taps vary over time.
- 7. A method of calculating an estimate of a bounded length channel having at most L non zero taps located within M symbol time intervals, said method comprising the steps of: calculating an initial channel estimate using a channel length of M taps;

calculating the energy of the taps of said initial channel estimate;

averaging said tap energies over time;

selecting a threshold in accordance with a noise floor calculated using the M-L taps having the lowest average energies;

selecting a number of taps N that are larger than said threshold; recalculating the value of said N channel taps; and

12410,0001 20

15

20

25

5

wherein L, M and N are positive integers.

- 8. The method according to claim 7, wherein said step of calculating said initial channel estimate is performed using a least squares technique.
- 9. The method according to claim 7, wherein said step of calculating said initial channel estimate is performed using a correlation technique.
 - 10. The method according to claim 7, wherein said channel taps are represented as zero mean, complex, Gaussian random processes.
 - 11. The method according to claim 7, wherein said channel taps are represented as non zero mean, complex, Gaussian random processes.
- 10 12. The method according to claim 7, wherein said channel taps vary over time.
 - 13. A cellular radio receiver for receiving and decoding a transmitted cellular signal, comprising:
 - a radio frequency (RF) receiver circuit for receiving and downconverting said transmitted cellular signal to a baseband signal;
 - a demodulator adapted to demodulate said baseband signal in accordance with the modulation scheme used to generate said transmitted cellular signal;

an equalizer comprising signal processing means programmed to:

calculate an estimate of a bounded length channel having at most L non zero taps located within an M symbol time interval;

calculate an initial channel estimate using a channel length of M taps; calculate the energy of the taps of said initial channel estimate; average said tap energies over time;

select a threshold in accordance with a noise floor calculated using the M-L taps having the lowest average energies;

select a number of taps N that are larger than said threshold; recalculate the value of said N channel taps;

a channel decoder adapted to decode the output of said equalizer so as to generate a decoded output data signal; and wherein L, M and N are positive integers.

21

20

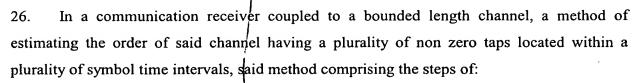
- 14. The receiver according to claim 13, further comprising a speech decoder operative to convert said decoded output data signal to an audible speech signal.
- 15. The receiver according to claim 13, further comprising circuit switch data means for converting said decoded output data signal to a data stream.
- 5 16. The receiver according to claim 13, further comprising packet switch data means for converting said decoded output data signal to a data stream.
 - 17. The receiver according to claim 13, wherein said equalizer is adapted to calculate said initial channel estimate utilizing a least squares technique.
- 18. The receiver according to claim 13, wherein said equalizer is adapted to calculate said initial channel estimate utilizing a correlation technique.
 - 19. The receiver according to claim 13, wherein said channel taps are represented as zero means, complex, Gaussian random processes.
 - 20. The receiver according to claim 13, wherein said channel taps are represented as non zero-mean, complex, Gaussian random processes.
- 15 21. The receiver according to claim 13, wherein said channel taps vary over time.
 - 22. The receiver according to claim 13, wherein said equalizer comprises means for performing a maximum likelihood sequence estimation (MLSE) technique.
 - 23. The receiver according to claim 13, wherein said equalizer comprises means for performing a sub-optimal complexity reduced maximum likelihood sequence estimation (MLSE) technique.
 - 24. The receiver according to claim 13, wherein said equalizer comprises means for performing a decision feedback equalization (DFE) technique.
 - 25. The receiver according to claim 13, wherein said receiver is adapted to receive and decode a global system for mobile communications (GSM) cellular signal.

22

12410.0001

5

10



calculating an initial channel estimate using a channel length comprising a first number of taps;

averaging over time the energy of said initial channel estimate utilizing said first number of taps;

selecting a threshold in accordance with a noise floor calculated using those taps corresponding to the lowest average energies; and

setting the channel order equal to the number of taps above said threshold.

- 27. The method according to claim 26, wherein step of calculating said initial channel estimate is performed using a least squares technique.
- 28. The method according to claim 26, wherein step of calculating said initial channel estimate is performed using a correlation technique.
- 15 29. The method according to claim 26, wherein said channel taps are represented as zero mean, complex, Gaussian random processes.
 - 30. The method according to claim 26, wherein said channel taps are represented as non zero-mean, complex, Gaussian random processes.
 - 31. The method according to claim 26, wherein said channel taps vary over time.

20 A25